

THE WESTERN AUSTRALIAN NATURALIST

Vol. 7

JULY 6th, 1960

No. 5

THE IMPORTANCE OF THE MARRI AS A FOOD SOURCE TO SOUTH-WESTERN AUSTRALIAN BIRDS

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OCCURRENCE AND FLOWERING OF THE MARRI

Marri (*Eucalyptus calophylla*) is a feature of the landscape all through South-Western Australia where the soil is suitable. The tree is an important component of the heavy forest belt and of the lighter woodland of the coastal plain. In association with blackboys (*Xanthorrhoea* species) and anthills it is considered a sign of good agricultural land. Along the Great Southern Highway and the South-Western Highway, from Perth to Albany, the Marri is prominent in the pasture, having been left in most cases as a shade tree for stock. Its spreading habit and dense foliage make it an admirable tree for this purpose, while it adds to the beauty of the countryside, particularly when covered in creamy-white blossom.

The Marri flowers, as a rule, during February and March, but odd trees may carry blossom up to July or August. Late flowering appears to be more noticeable when there has been little blossom in the normal February-March period. A heavy crop of blossom in one year is usually followed by very little the following year. The number of trees flowering, and the amount of honey produced by the blossom, varies from year to year. In Coolup in 1943 there was a heavy blossoming of marri in February-March, followed by a heavy blossoming of Jarrah (*Eucalyptus marginata*) in September-November. In 1944 there was little or no Marri blossom; in 1947 a very heavy Marri blossom; in 1948 very little; in 1949 good, and in 1952 a quite exceptionally heavy flowering. Farmers generally consider a heavy Marri blossoming as a sign of a wet winter to follow, and if it flowers early, an indication of an early break in the season. This belief is quite erroneous, however. Thus the heavy blossoming of 1943 was followed by one of the driest 12 months for 52 years.

Now we come to the season just passed. The summer of 1959-60 was cool, with two inches of rain from December 30 to January 1. The Marri flowering was very heavy, reaching a peak I have never seen equalled before, except perhaps in 1952. In most seasons only a percentage of Marri trees flower and some trees only poorly. In 1960, however, in the Coolup area 90% or more of the trees flow-

ered and the old trees, particularly, were completely covered with blossom and the honey flow was heavy. This flow of honey may have been helped by the late December rain, but the abnormally cool summer was probably the chief factor. In a normal season though the blossom may be profuse the flow of honey is controlled to a certain extent by the weather conditions prevailing at the time. Cool weather during the flowering period will increase the honey flow but hot dry weather, including strong east winds, will cut it off short.

BLOSSOM FEEDING BY BIRDS

The Marri honey flow, though of short duration (6 weeks to 2 months), is of value to the apiarist as at that time the other honey flora is at a rather low ebb. The Marri blossom is also a source of food to many nomadic honey- and insect-eating birds. The blossom is also sought after by most parrots and cockatoos in the area, whether for the pollen or nectar content is unknown. It is known, however, that some birds such as the White-tailed Black Cockatoo (*Calyptorhynchus baudinii*) consume large quantities of honey and there is no doubt that the King Parrot (*Purpurei-cephalus spurius*) and the Twenty-eight Parrot (*Barnardius zonarius*) also derive nourishment from the blossoms. The King Parrot is very partial to tree blossom and, besides Marri blossom, it eats the blossom of Jarrah, *Melaleuca*, and other plants, such as the Silky Oak (*Grevillea robusta*).

The value of the Marri blossom to these birds was made conspicuously evident to me on a trip I took in February-March 1952 across the Darling Range at Dwellingup and down the Great Southern Highway to Albany, returning through Nornalup, Manjimup and Bridgetown. It was the best Marri blossom season I had seen up to that time and one could not help noting the number of birds, mostly honeyeaters, which were feeding on the nectar. They made themselves conspicuous by the noise they created. In a valley of the Porongorups where there is an outlier of Karri (*Eucalyptus diversicolor*) I lay on the ground and endeavoured to identify the birds in the topmost foliage of the odd flowering Marri. The birds were keeping up an incessant chatter but were themselves almost invisible to the naked eye. It was with some difficulty that I was able to identify some of the birds with 12 x 50 binoculars. Prominent among them were two species of honeyeaters and the Purple-crowned Lorikeet (*Glossopsitta porphyrocophala*) which follows the honey flow of the numerous eucalypts and banksias. The lorikeet was plentiful even in the stunted Marri round the coastline at Albany.

I found in the fruitgrowing districts that it was generally accepted that a heavy blossom on the Marri trees meant less trouble from parrots and Silvereyes (*Zosterops australasiac*) in the orchards. However, when Marri blossom was poor these birds caused a great deal of damage. This is confirmed by my own experiences at Coolup. In January 1960 Red Wattle-birds (*Anthochaera carunculata*), Singing Honeyeaters (*Meliphaga virscens*),

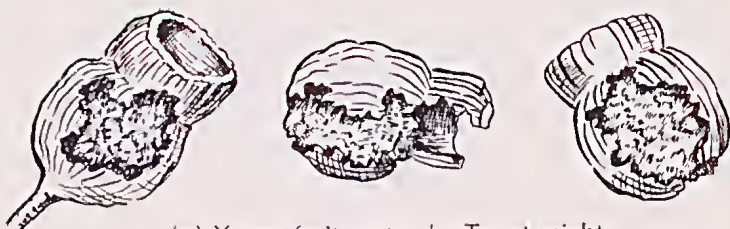
Silvereyes and parrots were visiting the fruit in the garden in increasing numbers. But early in February, when the Marri started to flower, all these birds left the garden and did not reappear until the honey flow was nearly over at the end of March. On March 31 a pair of Red Wattle-birds came back into the garden, followed over the next two weeks by the rest of the company. Their absence for two months meant that the pears and grapes developed uninjured. During this period most of the small birds spent their time in the Marri blossom, probably getting insects. Notable among these were Splendid Blue Wrens (*Malurus splendens*), Yellow-tailed and Brown Thornbills (*Acanthiza chrysorrhoa* and *A. pusilla*), Western Warblers (*Gerygone fusca*), Grey Fantails (*Rhipidura fuliginosa*), Rufous Whistlers (*Pachycephala rufiventris*), etc. In fact the only local birds not attracted to the Marri blossom were Magpies (*Gymnorhina dorsalis*), Grey Butcher-birds (*Cracticus torquatus*), Ravens (*Corvus coronoides*) and Hawks.

FRUIT-FEEDING BIRDS THE IMMATURE FRUIT

Following the blossoming a variable amount of fruit forms. The fruit, or "gum nut" as it is commonly called, matures to a hard, woody structure of comparatively great size, up to 2 in. in length, with the diameter of the bowl up to 1½ in. The fruit drops its black seeds over the next 16 months though the empty capsules may remain on the trees considerably longer. This means that some trees have new fruit forming, while they still have the green maturing fruit from the year before, besides the old brown and weather-worn capsules of previous years which had long since dropped their seeds. On April 21, 1960, odd trees had buds, flowers, immature fruit and green mature fruit from the year before. The dried up operculum in some cases was still adhering to the immature fruit.

If the Marri flowered regularly each year and produced an even crop it would provide a continuous supply of fruit in some form or other, particularly during the leanest period of the year, as far as food was concerned, and when the weather conditions were at their worst. Each fruit may develop up to three seeds of irregular shape. Most parrots and cockatoos are very fond of these fruits and spend much time extracting the seeds. As the fruit is procurable in some form throughout the year, though in variable quantity, it is of great economic value to these birds.

The association between the Marri and the King Parrot is well-known to ornithologists. Alexander (1930: 312) summarised and analysed most of the earlier records: McGilp (1931: 60) contributed a short paper; D. L. Serventy (1938: 169) mentioned it, and a number of writers since then. H. O. Webster (1948: 23) referred to the possibility of this parrot becoming extinct as clearing in the South-West continued and the number of Marri trees diminished. Though Marris are one of the few kinds of trees permitted to remain standing in cleared paddocks by farmers, they eventu-



(a) Young fruits eaten by Twenty-eight



(b) Fruits eaten by Twenty-eight



(c) Young fruits eaten by King Parrot



(d) Mature fruits eaten by King Parrot



(e) Mature fruits eaten by Red-tailed Black Cockatoo

Fig. 1.—Characteristic marks of parrot and cockatoo attack on Marri fruits.

Del. O. Seymour.

ally die or are blown down by winter storms and there is no regeneration, as stoek cat out the seedlings. However, the trees are eapable of rapid regrowth if left undisturbed. As yet there appears to be no decline in numbers of King Parrots in the Coolup district.

As soon as the Marri fruit has reached a stage where the seeds have developed the King Parrot attacks it. In 1960 this was about the third week in April (first observed on April 21). A few days before this the capsules had been tested by the birds inserting the point of the long bill into the bowl. When the parrots find a tree in which the fruit is just at the right stage all the birds in the vicinity concecntrate on the one tree. The young birds pick off a fruit and, while holding it with one foot by the stem or the lip, remove the skin by passing it through their bill in the same manner as a Budgerygah removes the husk from the seed of grasses. The parrots chop off the stem up to 2 in. from the bowl of the capsule. The older birds, however, pick a fruit, test it, and, if unsatisfactory, drop it and pick up another one. If the fruit is in the acceptable stage the bird chops its way into the bowl to remove the seed. This is done in the minimum time and in a most efficient manner.

The Twenty-eight chops the fruit to pieces in its very immature stage while it is still quite soft. Later when the eapsule is full size but still fleshy it removes the outside of the fruit and eats it. E. H. Sedgwick (1938: 82) estimated the freshly fallen capsules eaten by these parrots in the July-August period as 24,000 under one tree, but he had never noticed more than two Twenty-eights at any one time in the tree.

White-tailed Black Cockatoos tackle the immature fruit in a similar way to the King Parrot (cf. Carnaby, 1933: 106). The Red-tailed Black Coekatoo (*Calyptorhynchus banksi*) probably does the same, but not as neatly as does the King Parrot.

THE MATURE FRUIT

The great development of the King Parrot's upper mandible has aroused some controversy among ornithologists as to whether this is a speeial adaptation to extricate the seeds from the mature Marri fruit. The capsule is very hard and the bowl surrounding the seeds is almost impenetrable. The seeds are accessible only through the lip of the eapsule. The black cockatoos (both species) to a certain extent mutilate the lip of the capsule, when extracting the seeds, and leave imprints of the lower bill anywhere on the bowl (Fig. 1 (c)).

The adult King Parrot, however, has the finest technique. It revolves the capsule round while picking out the seed, leaving a circle of imprints of the lower mandible just below the neck (Fig. 1 (d)). The immature bird does not make such a good job of it and the lip of the capsule is often marked. The adult birds can extricate the seeds without marking the lip at all. This would be impossible without the elongated upper mandible. That experience is also necessary is shown by the difference in performanec of the

young birds as compared with the adults when dealing with both green and mature capsules.

The Twenty-eight does not appear to be interested in the mature fruit, though both species of parrot eat the seeds dropped on the ground. The King Parrot also extracts the seeds from dropped Marri capsules lying on the ground.

Alexander (1930: 312) does not think that the bill of the King Parrot is a special adaptation to deal with Marri fruit, one of his arguments being that the bird occurs outside of the Marri region, a point made also by other observers. Actually, however, the main part of the geographical range of the parrot coincides with that of the Marri and the extension beyond is comparatively narrow (cf. distributional data in Serventy and Whittell, 1951: 230). I consider that the commonly held view of ornithologists, that the long beak of the King Parrot had been evolved for the more efficient exploitation of the food sources of the Marri fruit, is a valid and reasonable hypothesis. This food supply, as I have pointed out, is not universally present and in some years may be in short supply. The elongated bill is still useful in extracting seeds from other eucalypts. Thus the bird is very proficient in extracting seeds from the very much smaller capsules of the Jarrah.

Cockatoos and parrots are very adaptable in exploiting new foods in a changing environment. In recent years the White-tailed Black Cockatoos, King Parrots and Twenty-eights have all exploited new food sources. All have discovered the food available in apple and pear orchards and the two parrots, in addition, attack stone fruits, almonds, etc. Up to 1947 it would appear that the Twenty-eight was the worst offender in the Coolup district but since then the King Parrot has been responsible for most of the damage to fruit. That the Twenty-eight is considered the easier bird to shoot might account for this change in status, but it is probable that the King Parrot has taken longer to realise the value of the orchard as a food source whilst there was an abundant supply of Marri for its needs. It is noticeable in this district that the Twenty-eights have shown a strong tendency to try many new fruits not indigenous to the area. At Coolup they now eat white cedar berries, pine cones, pie melons, grapes and, over the last five years, have taken to eating oranges, though as yet only a few birds are implicated.

The King Parrot, which also includes Wild Pear (*Xylomelum*), Sheoak (*Casuarina*) and *Hakea* seeds in its diet, may try these new foods but it has never become a consistent feeder on them. Orchard fruit appears to be the only unnatural food consumed in quantity by these parrots. Mr. J. H. Cox, of Coolup, informs me that they now regularly eat all the orchard oranges by making a small hole in the side and scooping out the contents, possibly in a search for the pips. The Silvereyes follow and clean up the inside of the fruit, the little birds almost disappearing into the hollow orange. Mr. H. P. Hannay, of Coolup, has found, however, that it is the Raven

(*Corvus coronoides*) which attacks his oranges as the initial predator.

The White-tailed Black Cockatoo, as shown by Perry (1948: 133), has resorted to the pine cones in the large plantations as part of its staple diet in recent years.

It is an interesting fact that all these birds only show interest in new foods during the winter period when the natural food is scarce. Twenty-eights do not eat pie melons except during this period. King Parrots do not worry the orchardist while the Marri is flowering.

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HERPETOLOGICAL MISCELLANEA

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XII. THE FAMILY SCINCIDAE IN WESTERN AUSTRALIA.

PART 3—THE GENUS *ABLEPHARUS*

Small skinks with no movable eyelid, a transparent disk covering the eye. Ear distinct; nostril pierced in the nasal; a supranasal present or absent. Parietals meet behind the interparietal. Limbs more or less developed. The lizards of this genus can be distinguished from *Lygosoma* by the immovable lower eyelid which is permanently fused in position over the eye.

KEY TO THE SPECIES

- I. Frontoparietals and interparietal fused. Fingers 5, toes 5.
 Upper eyelid represented by 3 or 4 enlarged scales, frontal not half the size of the interparietal *boutonii*
 Eye surrounded by granules, frontal more than half the size of the interparietal.
 Ear opening with 1 or 2 lobules, supranasals absent *lineo-ocellatus*
 Ear opening without lobules, supranasals present *taeniopleurus*